Street Traffic Studies, Ltd.

TRAFFIC IMPACT ANALYSIS
SILVER SPRING REGIONAL LIBRARY
MONTGOMERY COUNTY, MARYLAND

Prepared For:
Montgomery County Department of Public Libraries

Date: July 2009
Project Manager: Carl F. Starkey, P.E.
STS Job No.: 5746

400 Crain Highway, N.W. • Glen Burnie, Maryland 21061
Telephone 410.590.5500 • FAX 410.590.6637

CONTENTS

PAGE

INTRODUCTION 1

EXISTING CONDITIONS 3

- Existing Roadway Network 3
- Existing Road Network Summary 4
- Existing Traffic Volumes 8
- Analysis of Existing Traffic Conditions 11

BACKGROUND TRAFFIC ANALYSIS 13

- Planned Road Improvements 13
- Planned Development 13
- Trip Generation 16
- Trip Distribution 20
- Analysis of Background Traffic Conditions 25

SITE TRAFFIC ANALYSIS 26

- Trip Generation 26
- Trip Distribution 30
- Analysis of Total Traffic Conditions 31

PEDESTRIAN AND TRANSIT CONSIDERATIONS 38

- Pedestrian Analysis 39

POLICY AREA MOBILITY REVIEW 41

PURPLE LINE EVALUATION 44

CONCLUSIONS 45

EXHIBITS

1	SITE LOCATION	2
1A	STUDY AREA LOCATIONS	5
2	EXISTING LANE USE	6
2A	EXISTING LANE USE	7
3	EXISTING TRAFFIC VOLUMES	9
3A	EXISTING TRAFFIC VOLUMES	10
4	LOCATION OF PLANNED DEVELOPMENT	15
5	TRIPS GENERATED BY PLANNED DEVELOPMENT	21
5A	TRIPS GENERATED BY PLANNED DEVELOPMENT	22
6	BACKGROUND TRAFFIC VOLUMES	23
6A	BACKGROUND TRAFFIC VOLUMES	24
7	SITE GENERATED TRIPS - RESIDENTIAL	32
7A	SITE GENERATED TRIPS - COMMERCIAL	33
7B	SITE GENERATED TRIPS	34
8	TOTAL TRAFFIC VOLUMES	35
8A	TOTAL TRAFFIC VOLUMES	36

APPENDICES

A CORRESPONDENCE BETWEEN STS LTD AND MNCPPC

B VEHICLE TURNING MOVEMENT COUNTS

C CAPACITY WORKSHEETS - EXISTING CONDITIONS

D TRIP ASSIGNMENT SHEETS

E CAPACITY WORKSHEETS - BACKGROUND CONDITIONS

F REFERENCE DATA FOR SITE TRIP GENERATION

G CAPACITY WORKSHEETS - TOTAL CONDITIONS

H SOURCE DATA FOR PURPLE LINE

EXECUTIVE SUMMARY

The Montgomery County Department of Public Libraries is relocating the existing Silver Spring Library from its present location at the corner of Colesville Road and Spring Street to the southwest quadrant of the intersection of Fenton Street and Wayne Avenue, in the Silver Spring area of Montgomery County, Maryland. The overall project will include a 63,000 square foot library, a 20,000 square foot arts center, 146 residential hi-rise units, 22,000 square feet of retail space, and 15,000 square feet of office space for use by the Montgomery County government.

The trips generated by the use exceed the 30 trip threshold set forth in the *Local Area Transportation Review and Policy Area Mobility Review Guidelines* that would permit preparation of a simple traffic statement. Thus, it was understood that a full traffic study would be required. To establish the parameters of this study, the staff in the Transportation Planning Division of the Maryland National Capital Park & Planning Commission (MNCPPC) were contacted. Based on the parameters set forth by MNCPPC, Street Traffic Studies, Ltd. (STS LTD) prepared a traffic study to assess the traffic impact of the proposed relocation. In summary, the scope includes the procurement of current traffic data at a multitude of intersections, the addition of trips that can be generated by other approved but unbuilt developments in the general vicinity of the site, and the addition of trips expected to be generated by the subject property. Each of these steps included an analysis of the relationships between the level of traffic use and the capacity of each of the intersections specified for evaluation.

The study demonstrates that the proposed library relocation can be accommodated by the existing roadway system, without any adverse traffic impacts. Each critical intersection is projected to operate below the CLV threshold of 1800 for the Silver Spring CBD Policy Area.

Furthermore, the Silver Spring CBD Policy Area has a requirement that 10% of new trips must be mitigated to meet the standards established for Policy Area Mobility Review (PAMR). The relocation of the Silver Spring Library and the associated uses is projected to generate a minimum of 26 percent fewer trips than with the base rates; therefore, the project satisfies the PAMR goal of

a ten percent reduction when compared to the trip generation using the County wide rates. That is, the project is projected to generate fewer trips than a similar project located elsewhere in the County.

Finally, it is anticipated that a total of 108 person trips (pedestrians) will be generated during the evening peak hour (to and from the library). Combining these trips with the existing pedestrian movements at the intersection of Fenton Street and Wayne Avenue results in a peak hour flow of 245 pedestrians within the west leg crosswalk. This value can easily be accommodated with the existing facilities available at the intersection. The estimated volumes would result in a Level of Service "C" applying methodologies found in the 2000 Edition of the Highway Capacity Manual (HCM). Furthermore, the intersection of Wayne Avenue and Fenton Street currently has countdown pedestrian signals and adequate crosswalk markings.

INTRODUCTION

The Montgomery County Department of Public Libraries is relocating the existing Silver Spring Library from its present location at the corner of Colesville Road and Spring Street to the southwest quadrant of the intersection of Fenton Street and Wayne Avenue, in the Silver Spring area of Montgomery County, Maryland, as shown in Exhibit 1. The overall project will include a 63,000 square foot library, a 20,000 square foot arts center, 146 residential hi-rise units, 22,000 square feet of retail space, and 15,000 square feet of office space for use by the Montgomery County government.

The trips generated by the use exceed the 30 trip threshold set forth in the *Local Area Transportation Review and Policy Area Mobility Review Guidelines* that would permit preparation of a simple traffic statement. Thus, it was understood that a full traffic study would be required. To establish the parameters of this study, the staff in the Transportation Planning Division of the Maryland National Capital Park & Planning Commission (MNCPPC) were contacted. The results of this exchange (Scoping Agreement) is included in Appendix A.

Based on the parameters of the traffic impact study set forth in Appendix A, Montgomery County retained Street Traffic Studies, Ltd. (STS LTD) to prepare a traffic study as set forth in the *Local Area Transportation and Policy Area Mobility Review Guidelines*. In summary, the scope includes the procurement of current traffic data at a multitude of intersections, the addition of trips that can be generated by other approved but unbuilt developments in the general vicinity of the site, and the addition of trips expected to be generated by the subject property. Each of these steps included an analysis of the relationships between the level of traffic use and the capacity of each of the intersections specified for evaluation.

The following pages present the results of the analysis. In brief, the study demonstrates that the proposed library relocation can be accommodated by the existing roadway system, without any adverse traffic impacts.

STREET TRAFFIC STUDIES, LTD.

Exhibit 1
Site Location

EXISTING CONDITIONS

The purpose of this section is to describe the roadway system elements that will provide access to the subject site and the results of the traffic counts that were undertaken in accordance with the agreed upon scope of the study.

Existing Roadway Network

The proposed Silver Spring Library development site is served regionally by Colesville Road (US 29) and Georgia Avenue (MD 97). Local access is provided by Fenton Street and Wayne Avenue. The characteristics of these roads are described below.

Colesville Road (US 29) is a major road in the state highway system. It starts in Howard County and winds through Montgomery County to its terminus at Sixteenth Street at the Montgomery County/District of Columbia border. In the vicinity of the site it is generally a variable width undivided roadway with reversible lanes for peak direction traffic. Colesville Road serves as a major north-south commuter route. The posted speed limit in the vicinity of the site is 30 mph.

Georgia Avenue (MD 97) is also a major road in the state highway system. It follows a generally north-south orientation and has a six-lane divided cross section. Georgia Avenue extends northward from the District of Columbia and travels through Montgomery County into Carroll County, Maryland. Georgia Avenue also acts as a major commuter link between Montgomery County and the District of Columbia.

Fenton Street is an arterial roadway in the Montgomery County Master Plan of Highways. It has a north-south orientation and serves as an alternate route for north-south travel within the Silver Spring Central Business District (CBD). Fenton Street extends southward from its terminus at Cameron Street into the town of Takoma Park. It has a posted speed limit of 25 mph.

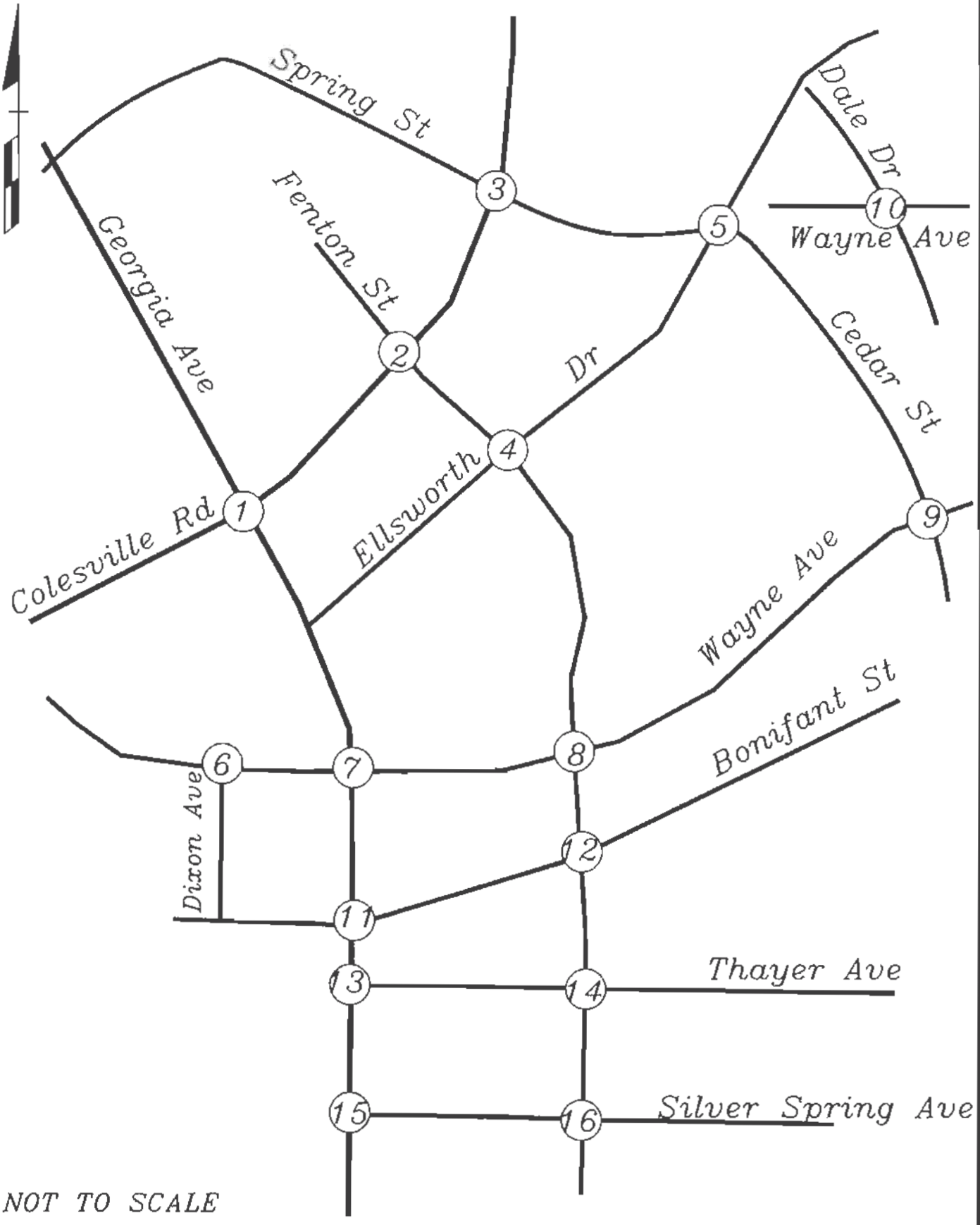
Wayne Avenue is also an arterial roadway in the Montgomery County Master Plan of Highways. It will serve as the main access for parking for the project. Montgomery County Garage #60 will act as the primary parking supply for the project.

Existing Road Network Summary

Based on the *Local Area Transportation Review and Policy Area Mobility Review Guidelines* , a project generating more than 250 peak hour trips requires a review of a minimum of two (2) signalized intersections in each direction from the site. The following intersections were determined to be critical to the analysis of the proposed development:

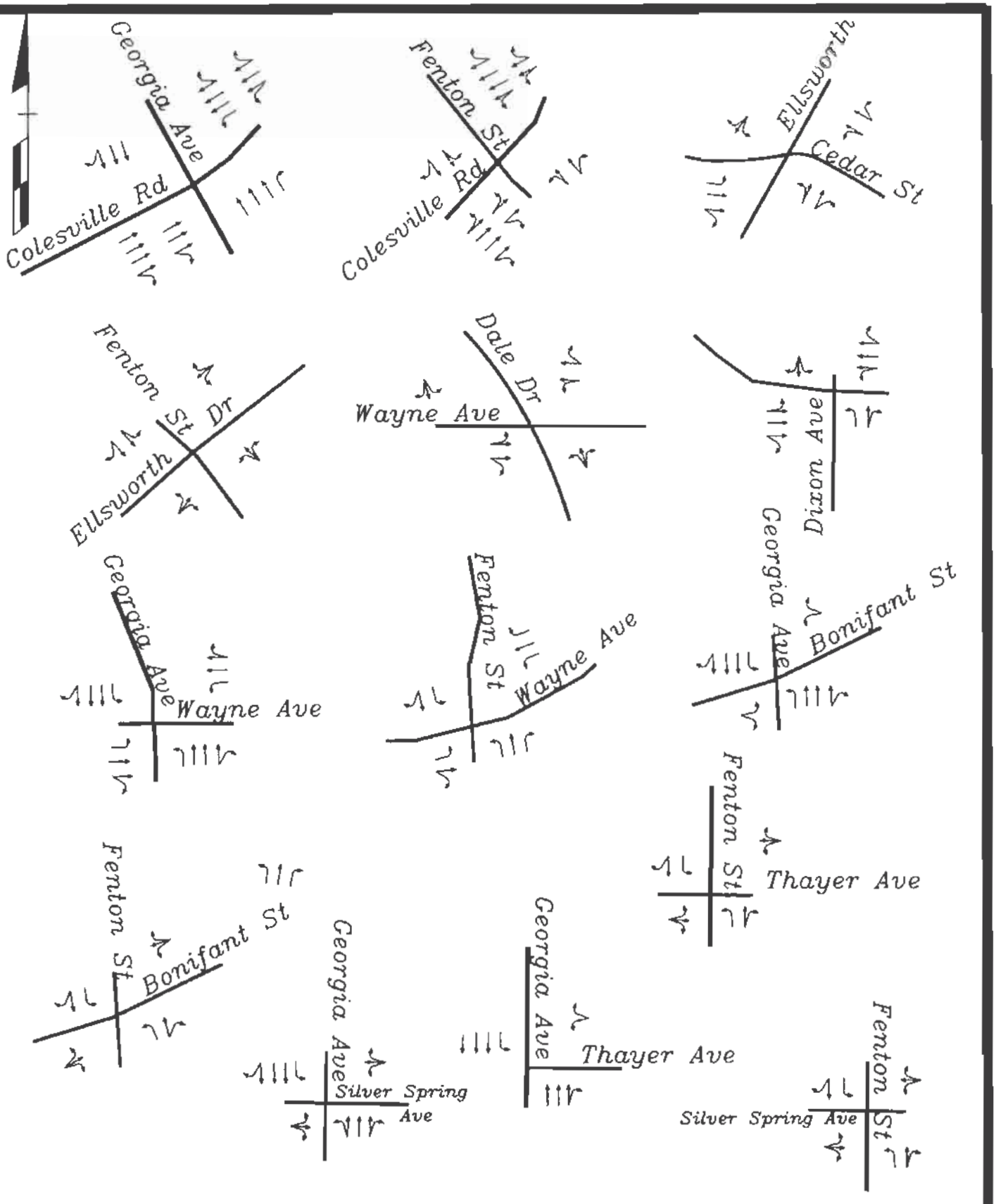
- Colesville Road at Spring Street
- Colesville Road at Georgia Avenue
- Ellsworth Drive at Cedar Street/Spring Street
- Ellsworth Drive at Fenton Street
- Wayne Avenue at Dale Drive
- Wayne Avenue at Cedar Street
- Wayne Avenue at Fenton Street
- Wayne Avenue at Georgia Avenue
- Wayne Avenue at Dixon Avenue
- Bonifant Street at Fenton Street
- Bonifant Street at Georgia Avenue
- Thayer Avenue at Georgia Avenue
- Thayer Avenue at Fenton Street
- Silver Spring Avenue at Fenton Street
- Silver Spring Avenue at Georgia Avenue

The study area locations are shown in Exhibit 1A, and the approach lanes at the intersections that were analyzed are shown in Exhibits 2 and 2A.



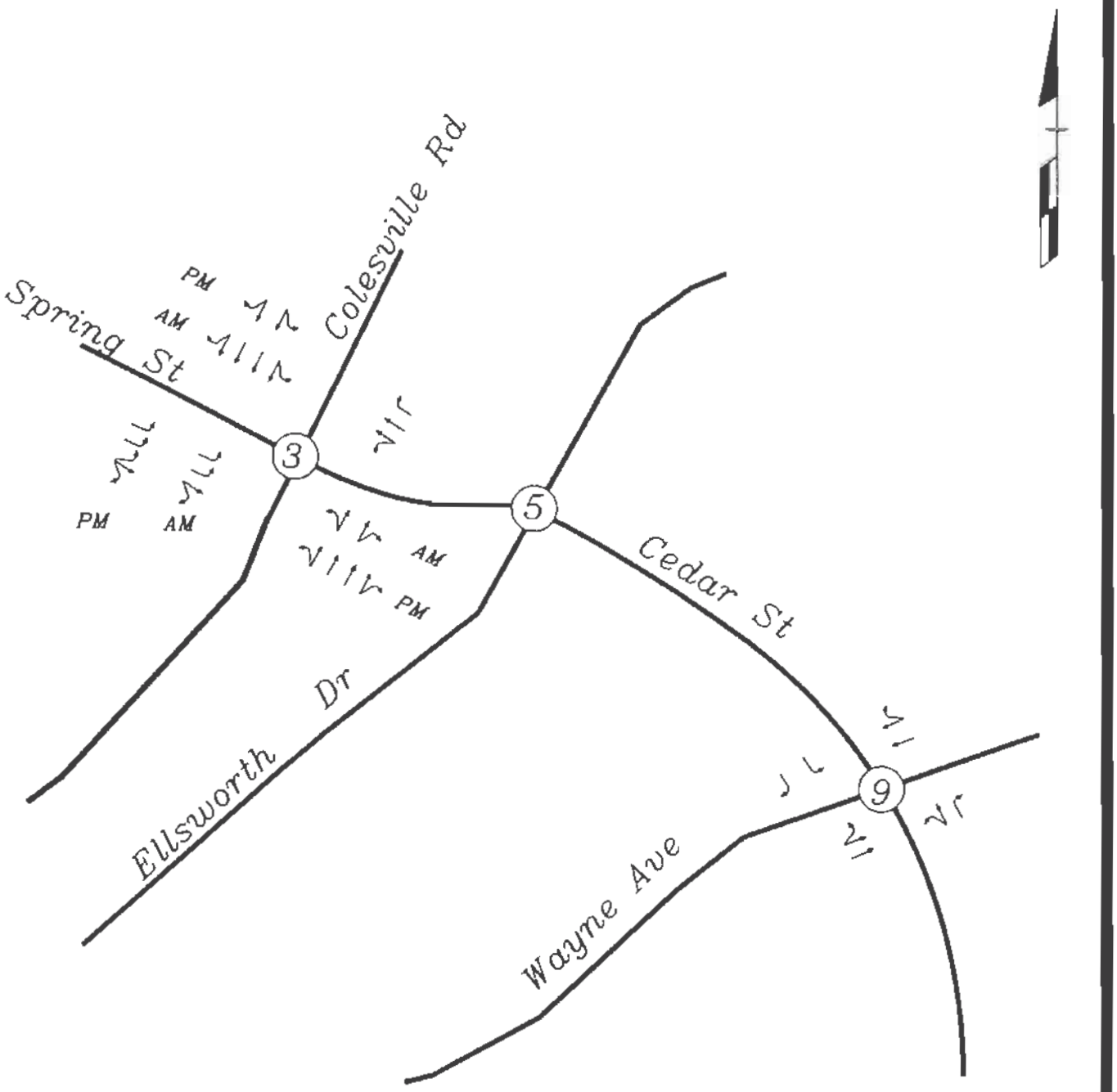
STREET TRAFFIC STUDIES, LTD.

Exhibit 1A
Study Area Locations



STREET TRAFFIC STUDIES, LTD.

Exhibit 2
Existing Lane Use



NOT TO SCALE

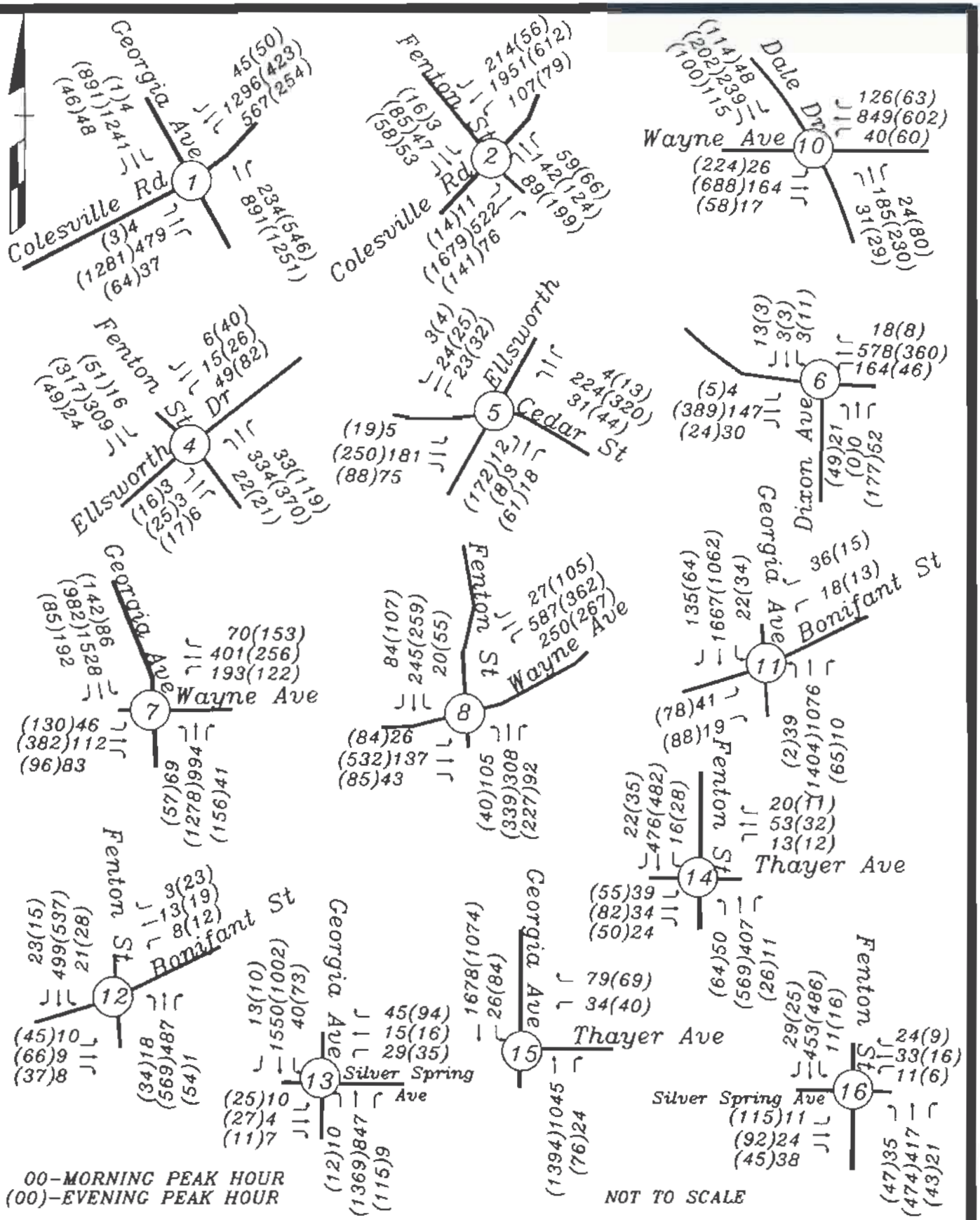
00–MORNING PEAK HOUR
(00)–EVENING PEAK HOUR

STREET TRAFFIC STUDIES, LTD.

Exhibit 2A
Existing Lane Use

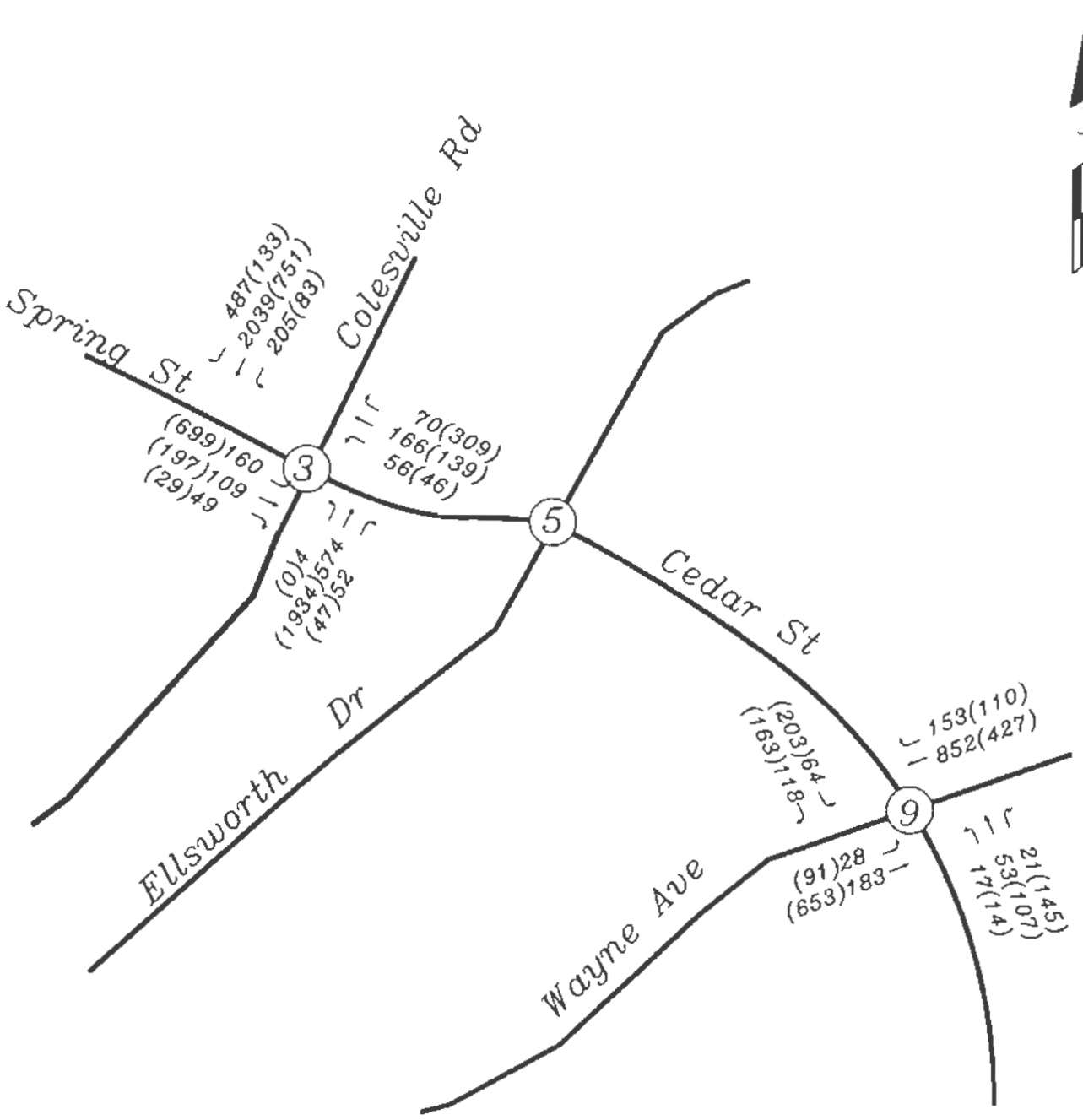
Existing Traffic Volumes

Manual turning movement traffic counts were conducted by SIS LTD on Wednesday, April 15, Thursday, April 16, Wednesday April 22, Thursday April 23, Tuesday, April 28, Tuesday, May 12 and Wednesday, May 27, 2009, between the hours of 6:30 - 9:30 AM and 4:00 - 7:00 PM at the critical study intersections. The summarized data for these locations is included in Appendix B and the peak one hour flows are shown in Exhibits 3 and 3A. It is important to note that Montgomery County Schools were in session during the dates noted above.



STREET TRAFFIC STUDIES, LTD.

Exhibit 3
Existing Traffic Volumes



NOT TO SCALE

00-MORNING PEAK HOUR
(00)-EVENING PEAK HOUR

STREET TRAFFIC STUDIES, LTD.

Exhibit 3A
Existing Traffic Volumes

Analysis of Existing Traffic Conditions

"Capacity Analysis" is the term applied to the methodology used to evaluate traffic flow conditions. For planning purposes, and in situations were a comparative analysis is desired, the "critical lane technique" has been found to be the most useful and easy to understand among the several methods available for analyzing the relationship between the actual volume of traffic using an intersection and the maximum amount that can be accommodated before the intersection would be expected to fail. The critical lane technique that has been selected for use herein attaches a weighing factor to the critical lane and uses a scale of volumes which establishes the "theoretical" capacity at 1,600 critical movements in an hour. MNCPPC guidelines establish Level of Service "F" (*critical lane volume of 1800*) as the lowest acceptable condition for planning purposes in the Silver Spring CBD Policy Area.

The peak hour traffic volumes shown in Exhibit 3 were subjected to a capacity analysis procedure using the critical lane methodology as specified in the LATR. The results of the analysis are set forth in Table 1 and the worksheets from which they are derived are included in Appendix C.

TABLE 1

RESULTS OF CAPACITY ANALYSIS

EXISTING TRAFFIC CONDITIONS

INTERSECTION	MORNING PEAK HOUR	EVENING PEAK HOUR
Colesville Rd @ Spring St	1072	1226
Colesville Rd @ Georgia Ave	1238	1109
Ellsworth Dr @ Cedar Street	229	456
Ellsworth Dr at Fenton St	466	701
Wayne Ave at Dale Dr	997	1061
Wayne Ave at Cedar St	668	539
Wayne Ave at Fenton St	1047	983
Wayne Ave at Georgia Ave	1002	1048
Wayne Ave at Dixon Ave	340	389
Bonifant St at Fenton St	575	811
Bonifant St at Georgia Ave	801	684
Thayer Ave at Georgia Ave	734	737
Thayer Ave at Fenton St	673	822
Silver Spring Ave at Fenton St	601	816
Silver Spring Ave at Georgia Ave	687	797

X - Critical Lane Volume

As shown in Table 1, each of the intersections that were studied is below the current Congestion Standard threshold of 1800 for the Silver Spring CBD Policy Area.

BACKGROUND TRAFFIC ANALYSIS

In accordance with procedures established by MNCPPC, the analysis of the traffic impact of Silver Spring Library relocation must include planned roadway improvements, and increases in traffic generated by other planned developments in the vicinity of the site. Information concerning these two factors is discussed below.

Planned Road Improvements

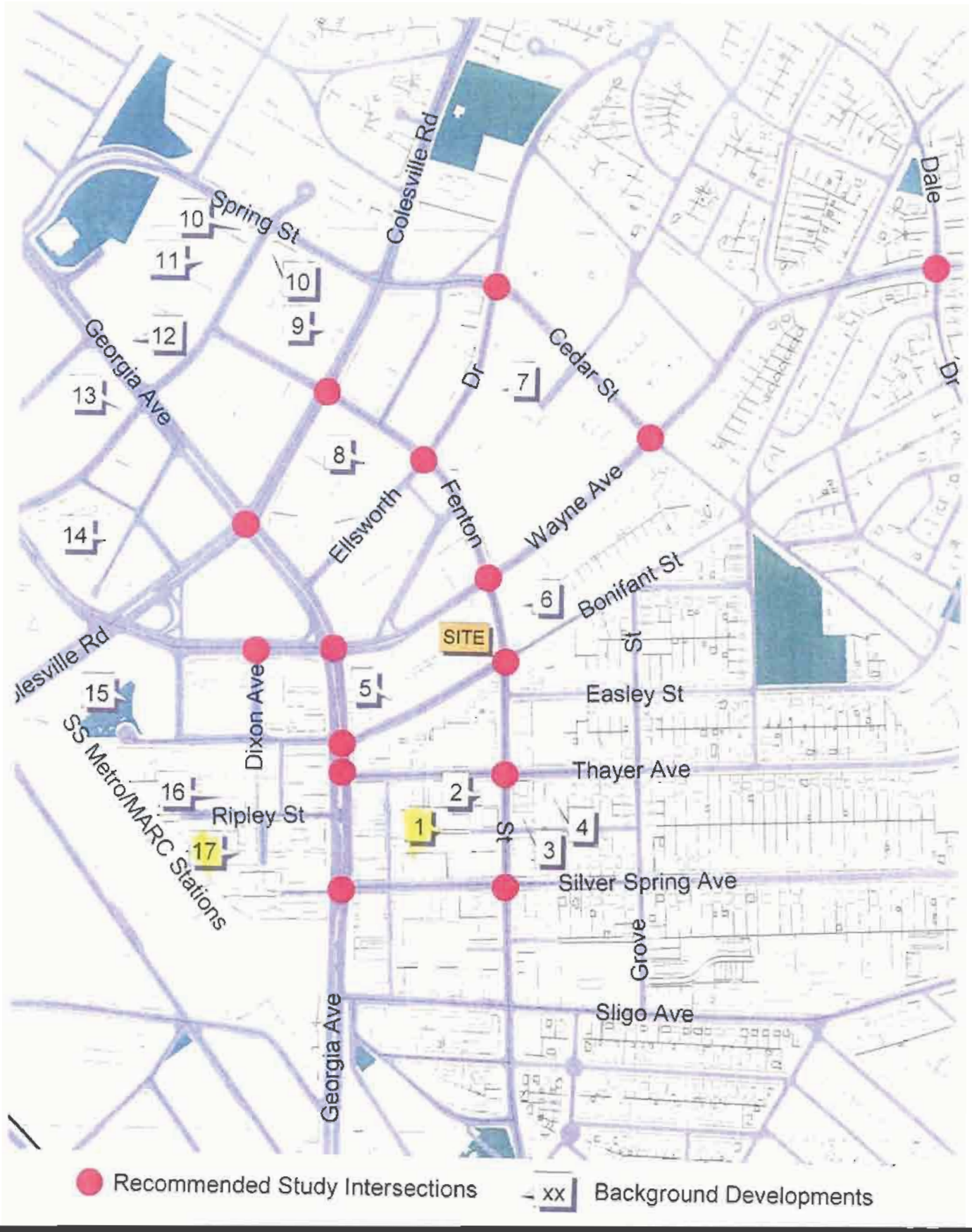
A review of Montgomery County Department of Transportation (MCDOT) files indicated that there are no current projects planned in the immediate vicinity of the site. Additional review of the Maryland State Highway Administration (MSHA) Capital Improvement Program also revealed no significant roadway projects within the study area.

Planned Developments

The scoping letter received from the staff at M-NCPPC indicated the names and densities of the seventeen (17) projects are included in Table 2, and relative location of each site is shown in Exhibit 4.

TABLE 2
BACKGROUND DEVELOPMENTS

NAME	LAND USE
1.Studio Plaza	60,862 sf retail 344,713 sf office 420 hi-rise
2.Easley Subdivision	15,000 sf retail 18,200 sf office 95 hi-rise
3. 8227 Fenton Street	4,613 sf retail 4,613 sf office
4. 814 Thayer Avenue	52 multi-family
5. Bonifant Plaza	72 hi-rise
6. 8415 Fenton Street	84,100 sf retail 91,000 sf office 45,000 sf church
7. Veterans Plaza	41,986 sf civic center 222 hi-rise
8.City Place	299.307 sf office
9. Homewood Suites	272 room hotel
10. United Technologies	16,000 sf retail 148,598 sf office 48,000 sf office
11. Cameron House	7,330 sf retail 325 hi-rise
12. 8711 Georgia Avenue	4,462 sf retail 148,278 office
13. 8700 Georgia Avenue	7,980 sf retail 21,540 sf office 106 hi-rise
14. Portico	158 hi-rise
15. Sarbarnes Transit Ctr.	467 hi-rise 196 room hotel
16. Ripley North	5,380 sf retail 317 hi-rise
17. Ripley South	7,460 sf retail 318 hi-rise



STREET TRAFFIC STUDIES, LTD.

Exhibit 4
Location of
Planned Development

Trip Generation

To determine the traffic associated with each of the background developments, trip generation rates were obtained from the *Local Area Review and Policy Area Mobility Review Guidelines* dated *January 2008*, and the Institute of Transportation Engineers publication, *Trip Generation, 8th Edition*. The trip generation rates are shown in Table 3, and the generated trips are shown in Table 4.

TABLE 3

BACKGROUND TRIP GENERATION

DEVELOPMENT	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Residential Hi Rise						
Trips/DU	T=0.30(x)			T=0.30(x)		
	20%	80%	100%	70%	30%	100%
Retail						
Trips/1000 sf	T=0.50(y)			T=2.00(y)		
	50%	50%	100%	50%	50%	100%
Office (CBD)						
Trips/1000 sf	T=1.40(y)			T=1.40(y)		
	85%	15%	100%	15%	85%	100%
Hotel						
Trips/rm	T=0.20(y)			T=0.20(y)		
	60%	40%	100%	55%	45%	100%
Church						
Trips/1000 sf	T=0.56(y)			T=0.34(y)+5.24		
	62%	38%	100%	48%	52%	100%
Lab						
Trips/1000 sf*	T=1.40(y)			T=1.40(y)		
	85%	15%	100%	15%	85%	100%
Civic Center						
Trips/1000 sf*	T=1.40(y)			T=1.40(y)		
	85%	15%	100%	15%	85%	100%

X - Number of units

Y - 1,000's of square feet

* - Rate based on discussions with MNCPPC staff, see Appendix A.

TABLE 4
BACKGROUND TRIP GENERATION

DEVELOPMENT	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Studio Plaza						
Trips/60,862 sf	15	15	30	61	61	122
Trips/344,713 sf	411	72	483	72	411	483
Trips/420 Hi Rise	25	101	126	88	38	126
Easley Subdivision						
Trips/1,500 sf	0	1	1	2	1	3
Trips/18,200 sf	21	4	25	4	21	25
Trips/95 Hi Rise	6	23	29	20	9	29
8227 Fenton St						
Trips/4,613 sf	1	1	2	5	4	9
Trips/4,613 sf	5	1	6	1	5	6
814 Thayer Ave						
Trips/52 Hi Rise	3	13	16	11	5	16
Bonifant Plaza						
Trips/72 Hi Rise	4	18	22	15	7	22
8415 Fenton St						
Trips/84,100 sf	21	21	42	84	84	168
Veterans's Plaza						
Trips/41,986 sf	50	9	59	9	50	59
Trips/222 Hi Rise	13	54	67	47	20	67
City Place						
Trips/299,307 sf	356	63	419	63	356	419
Homewood Suites						
Trips/272 rm	32	22	54	30	24	54
United Technologies						
Trips/16,000 sf	4	4	8	16	16	32
Trips/148,598 sf	177	31	208	31	177	208
Trips/48,000 sf	57	10	67	10	57	67
Cameron House						
Trips/7,330 sf	2	2	4	8	7	15
Trips/325 Hi Rise	20	78	98	69	29	98
8711 Georgia Ave						
Trips/4,462 sf	1	1	2	5	4	9
Trips/148,278 sf	177	31	208	31	177	208

TABLE 4
BACKGROUND TRIP GENERATION
CONTD.

DEVELOPMENT	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
8700 Georgia Ave						
Trips/7,980 sf	2	2	4	8	8	16
Trips/21,540 sf	25	5	30	5	25	30
Trips/106 Hi Rise	6	26	32	22	10	32
Portico						
Trips/158 Hi Rise	9	38	47	33	14	47
Sarbarnes Transit Ctr						
Trips/467 Hi Rise	28	112	140	98	42	140
Trips/ 196 rm	23	16	39	21	18	39
Ripley North						
Trips/5,380 sf	2	1	3	6	5	11
Trips/317 Hi Rise	19	76	95	67	28	95
Ripley South						
Trips/7,460 sf	2	2	4	8	7	15
Trips/318 Hi Rise	19	76	95	67	28	95

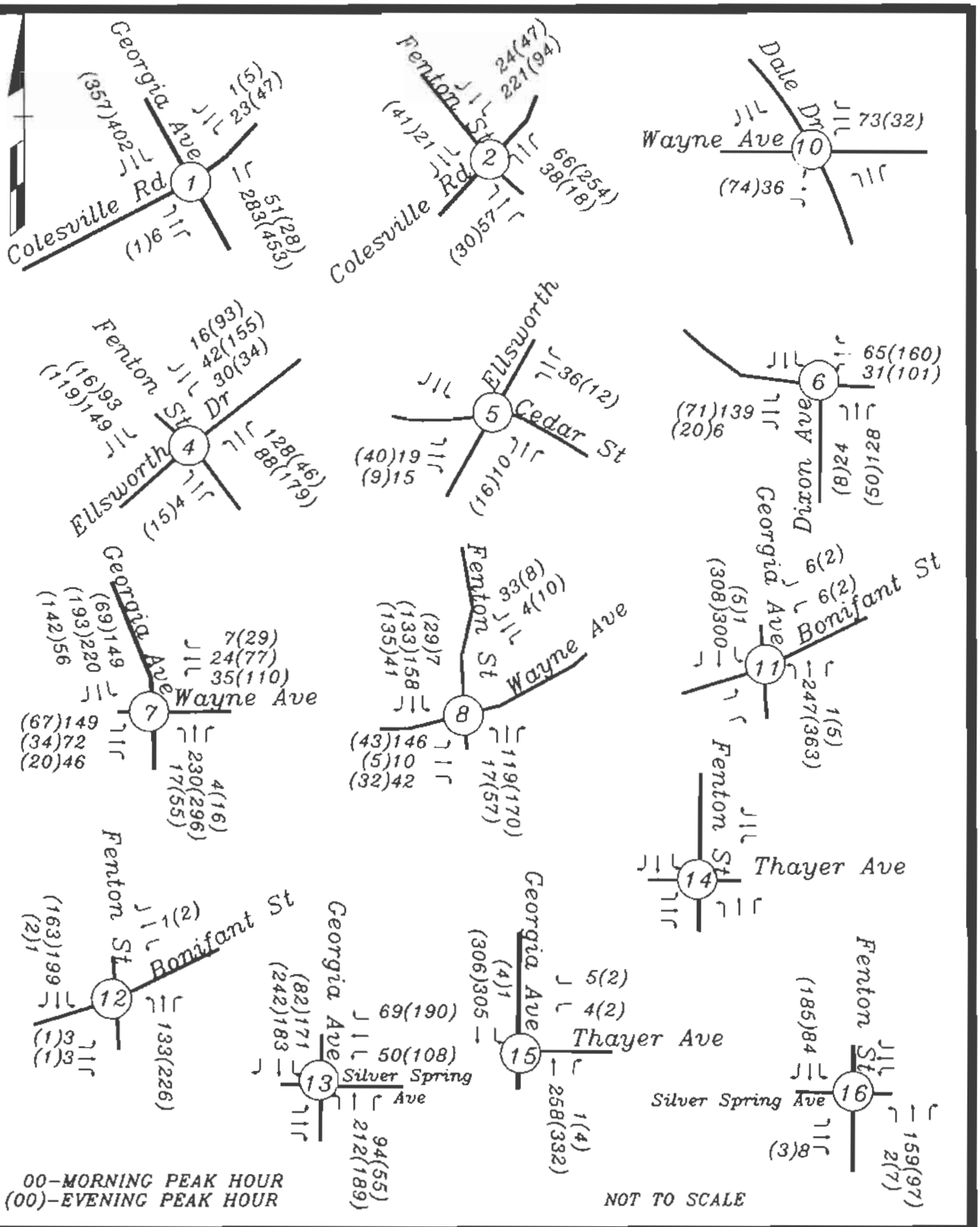
Trip Distribution

The trip distribution for the planned projects was derived through a review of the trip distribution for the Silver Spring/Takoma Park Super District 2, as well as, collaborative conversations with Transportation Staff. The assumed distribution is shown below. The specific distribution for each site is contained in the assignments located in Appendix D. The resultant assumed distribution is shown below.

TRIP DISTRIBUTION
BACKGROUND DEVELOPMENTS

DIRECTION	PERCENTAGE
Residential	
North on MD 97	34%
North on US 29	15%
South on MD 97/US 29	32%
West on MD 410	4%
East on MD 410	11%
East on MD 193	4%
Commercial	
North on MD 97	34%
North on US 29	26%
South on MD 97/US 29	19%
West on MD 410	5%
East on MD 410	8%
East on MD 193	8%

The traffic associated with each project was assigned to the road network. The total trips generated by the planned projects is shown in Exhibits 5 and 5A. These trips were combined with the existing volumes to produce the Background Traffic Volumes shown in Exhibits 6 and 6A. The individual assignment sheets for each project are contained in Appendix D.

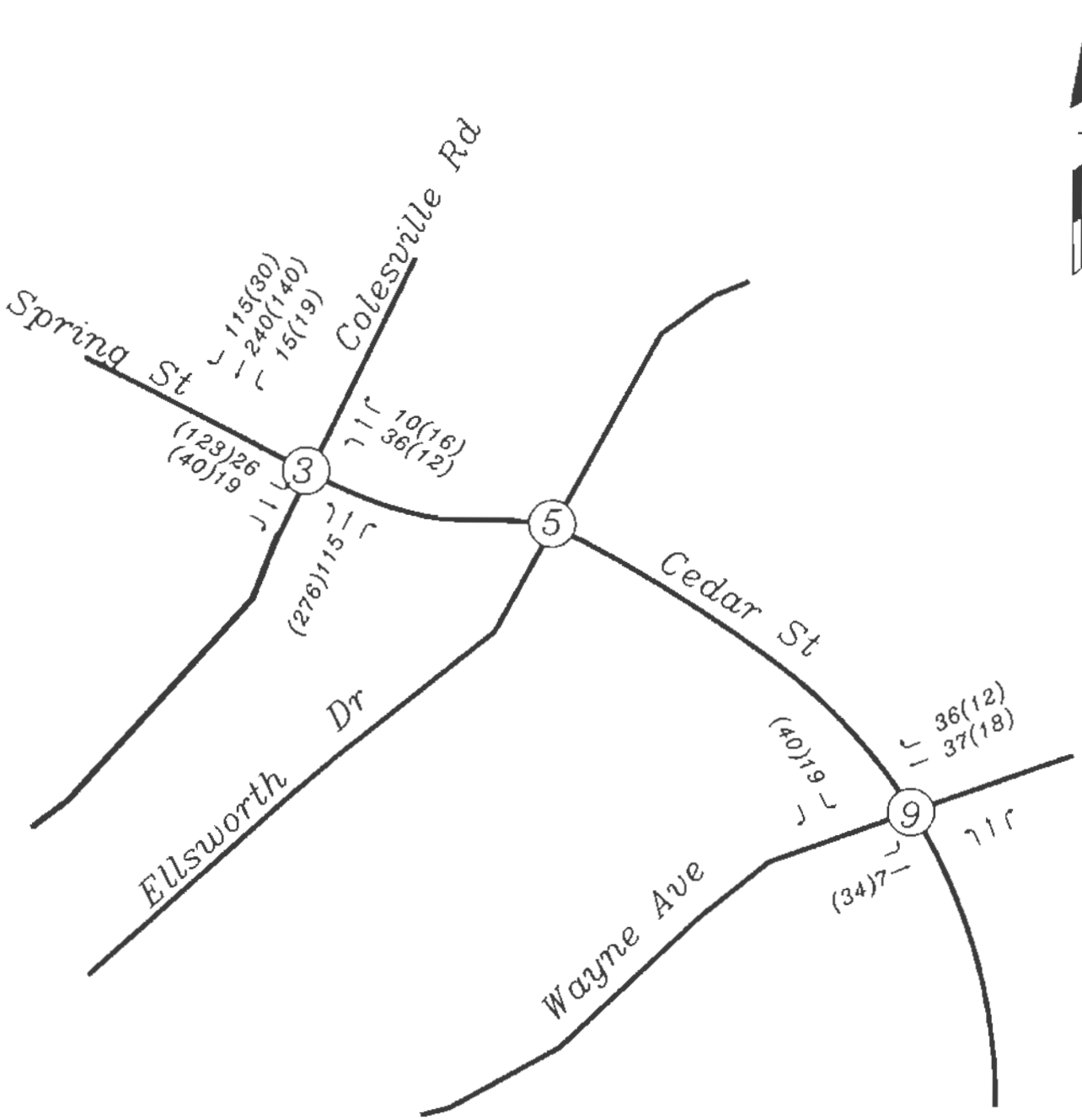


00-MORNING PEAK HOUR
(00)-EVENING PEAK HOUR

NOT TO SCALE

STREET TRAFFIC STUDIES, LTD.

Exhibit 5
Trips Generated By Planned Developments

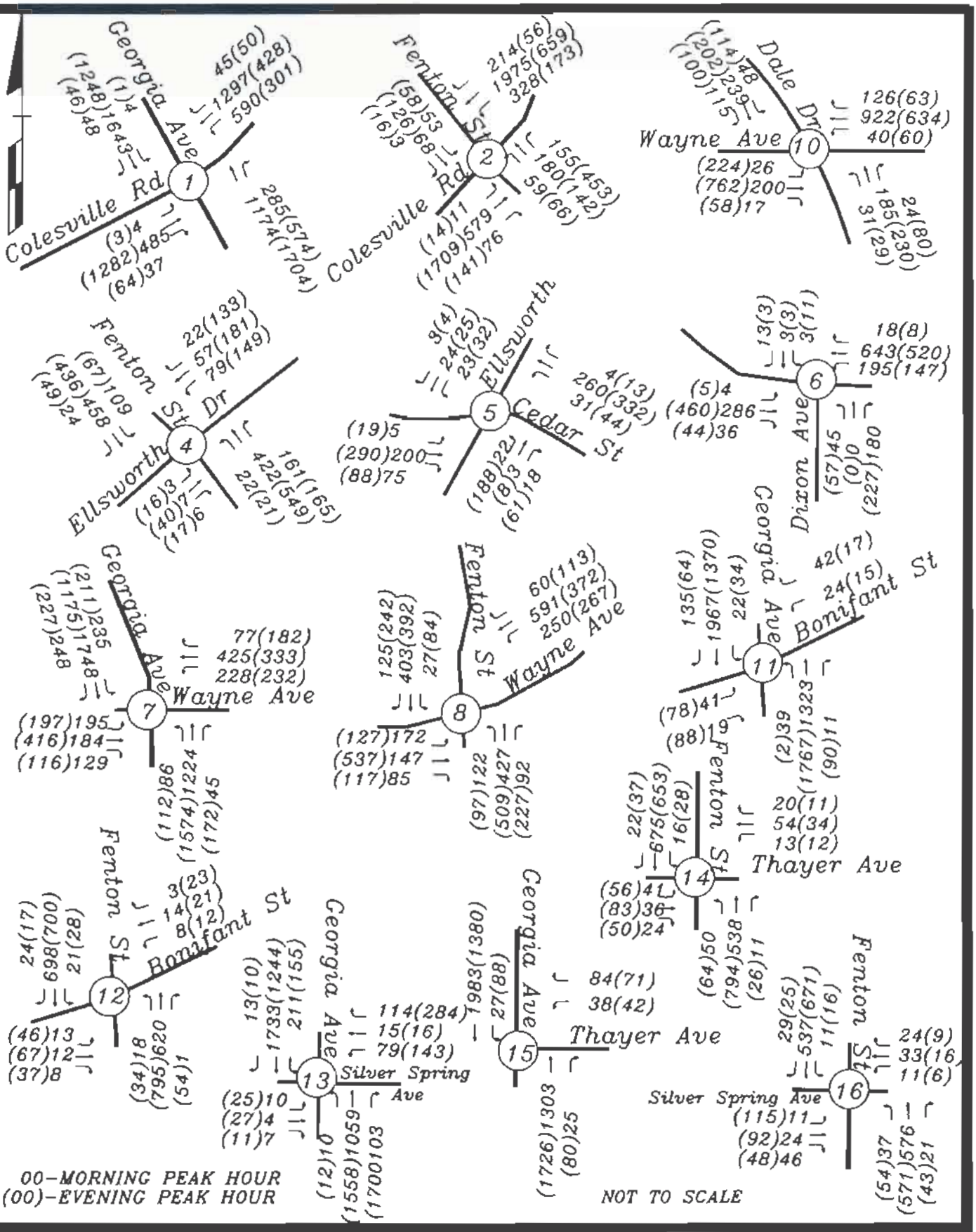


00–MORNING PEAK HOUR
(00)–EVENING PEAK HOUR

NOT TO SCALE

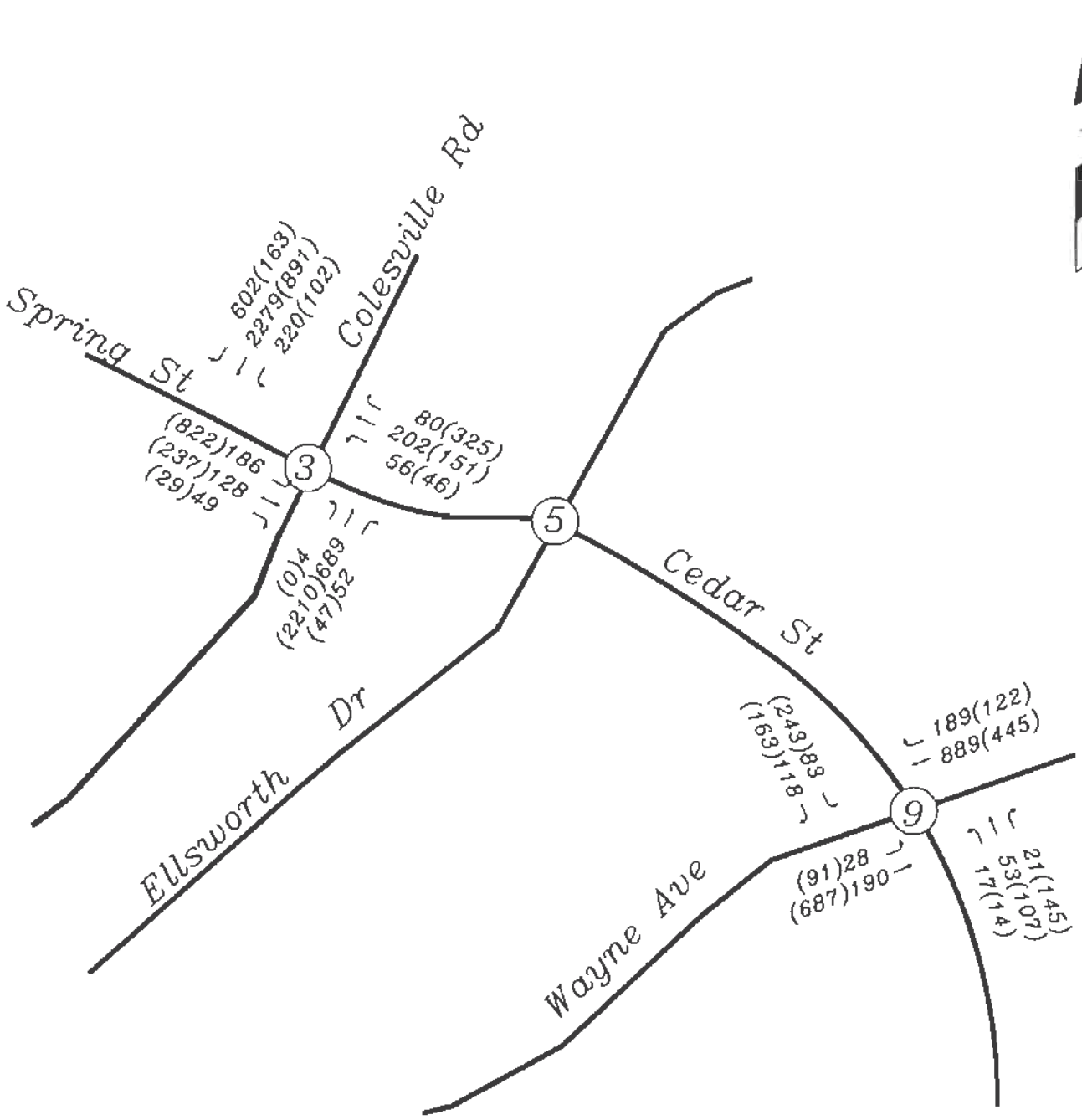
STREET TRAFFIC STUDIES, LTD.

Exhibit 5A
Trips Generated By Planned Development



STREET TRAFFIC STUDIES, LTD.

Exhibit 6
Background Traffic Volumes



NOT TO SCALE

00–MORNING PEAK HOUR
(00)–EVENING PEAK HOUR

STREET TRAFFIC STUDIES, LTD.

Exhibit 6A
Background Traffic Volumes

Analysis of Background Traffic Conditions

Capacity analyses were performed, applying the critical lane technique to the background traffic volumes. The results of the analyses are presented in Table 5.

TABLE 5
RESULTS OF CAPACITY ANALYSIS
BACKGROUND TRAFFIC CONDITIONS

INTERSECTION	MORNING PEAK HOUR	EVENING PEAK HOUR
Colesville Rd @ Spring St	1217	1382
Colesville Rd @ Georgia Ave	1412	1324
Ellsworth Dr @ Cedar Street	249	493
Ellsworth Dr at Fenton St	809	1063
Wayne Ave at Dale Dr	1037	1093
Wayne Ave at Cedar St	706	557
Wayne Ave at Fenton St	1413	1345
Wayne Ave at Georgia Ave	1286	1371
Wayne Ave at Dixon Ave	504	573
Bonifant St at Fenton St	781	1039
Bonifant St at Georgia Ave	924	831
Thayer Ave at Georgia Ave	856	869
Thayer Ave at Fenton St	875	1049
Silver Spring Ave at Fenton St	700	1011
Silver Spring Ave at Georgia Ave	874	1267

X - Critical Lane Volume

As shown in Table 1, each of the intersections that were studied is below the current Congestion Standard threshold of 1800 for the Silver Spring CBD Policy Area. The capacity calculations are contained in Appendix E.

SITE TRAFFIC ANALYSIS

The Montgomery County Department of Public Libraries is relocating the existing Silver Spring Library from its present location at the corner of Colesville Road and Spring Street to the southwest quadrant of the intersection of Fenton Street and Wayne Avenue, in the Silver Spring area of Montgomery County, Maryland, as shown in Exhibit 1. The overall project will include a 63,000 square foot library, a 20,000 square foot arts center, 146 residential hi-rise units, 22,000 square feet of retail space, and 15,000 square feet of office space for use by the Montgomery County government. Access for the site is proposed via Wayne Avenue, and parking will be provided within Public Garage #60 located opposite the development.

Trip Generation

To determine the traffic associated with the relocation of the Silver Spring Regional Library, STS LTD consulted several sources. First the rates established by ITE, within the publication *Trip Generation, 8th Edition*, were reviewed. The rates established by ITE appeared higher than that which would be expected for an urban library; therefore, STS LTD consulted various studies whose research was published on the internet. Specifically, two studies were shown to reflect the above opinion. The first, an analysis conducted for the relocation of the Merrimack Public library located in Merrimack, New Hampshire, indicated that the ITE rate was excessive, and that library staff felt that the proposed increase in square footage would result in a 30 - 50% increase in patronage. This was based on the projected increase in reading materials available to the public.

To determine the existing vehicular trips to and from the existing library, STS LTD conducted driveway volume counts on, Wednesday, April 22, 2009, between the hours of 3:00 - 7:00 PM (Note: the current library does not open before 10:00 AM).

Likewise, an analysis conducted in Scottsdale, Arizona resulted in trip rates far lower than those presented in ITE. The Scottsdale study resulted in a trip rate of 1.56 per 1,000 square feet of space during the morning peak hour and 3.37 during the evening peak hour.. This compares favorably to the overall rate for the Silver Spring Library when factoring the existing trips by 1.5 to reflect a 50 percent increase in patronage.

A similar approach was used to determine the trip rate for the proposed Arts Center. STS LTD utilized rates obtained in a July 2007 study for the St. Ivel site located in Wiltshire County, England (Note: ITE included a single observation for the peak hour of the generator only.) The resulting rates were 0.67 trips per 1,000 square feet of floor area during the morning peak and 1.92 during the evening peak.

The reports prepared in support of the studies noted above are contained in Appendix F. The trip generation rates are shown in Table 6 and the resulting trips are presented in Table 7.

TABLE 6
SILVER SPRING LIBRARY SITE
TRIP GENERATION

DEVELOPMENT	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Generation Rates						
Office						
Trips/1,000 sf	T=1.40(x)			T=1.40(x)		
	85%/15%			15%/85%		
Retail						
Trips/1,000 sf	T=0.50(x)			T=2.00(x)		
	50%/50%			50%/50%		
Hi-Rise						
Trips/DU	T=0.30(y)			T=0.30(y)		
	20%/80%			70%/30%		
Library[1]						
Trips	T=1.56(x)			T=Existing trips x 1.50		
Arts Center[2]						
Trips/1,000 sf	T-0.67(x)			T=1.92(x)		
	100%/0%			0%/100%		

[1]See Appendix F for derivation of trips rates

[2]See Appendix F for derivation of trips rates

TABLE 7
SILVER SPRING LIBRARY SITE TRIP GENERATION

DEVELOPMENT	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Library						
Trips/63,000 sf	68	30	98	128	119	247
Arts Center						
Trips/20,000 sf	13	0	13	0	38	38
Hi-Rise						
Trips/146 units	9	35	44	31	13	44
Retail						
Trips/22,000 sf	6	5	11	22	22	44
Office						
Trips/15,000 sf	18	3	21	3	18	21
TOTALS	114	73	187	184	210	394

Trip Distribution

The last factor that is required to convert the trips generated by the activity on the site to traffic on the adjacent roads is the distribution of trips. The trip distribution for the subject site was derived through a review of the trip distribution for the Silver Spring/Takoma Park Super District 2. The assumed distribution is the same as for the background developments, and has been shown below for completeness.

TRIP DISTRIBUTION

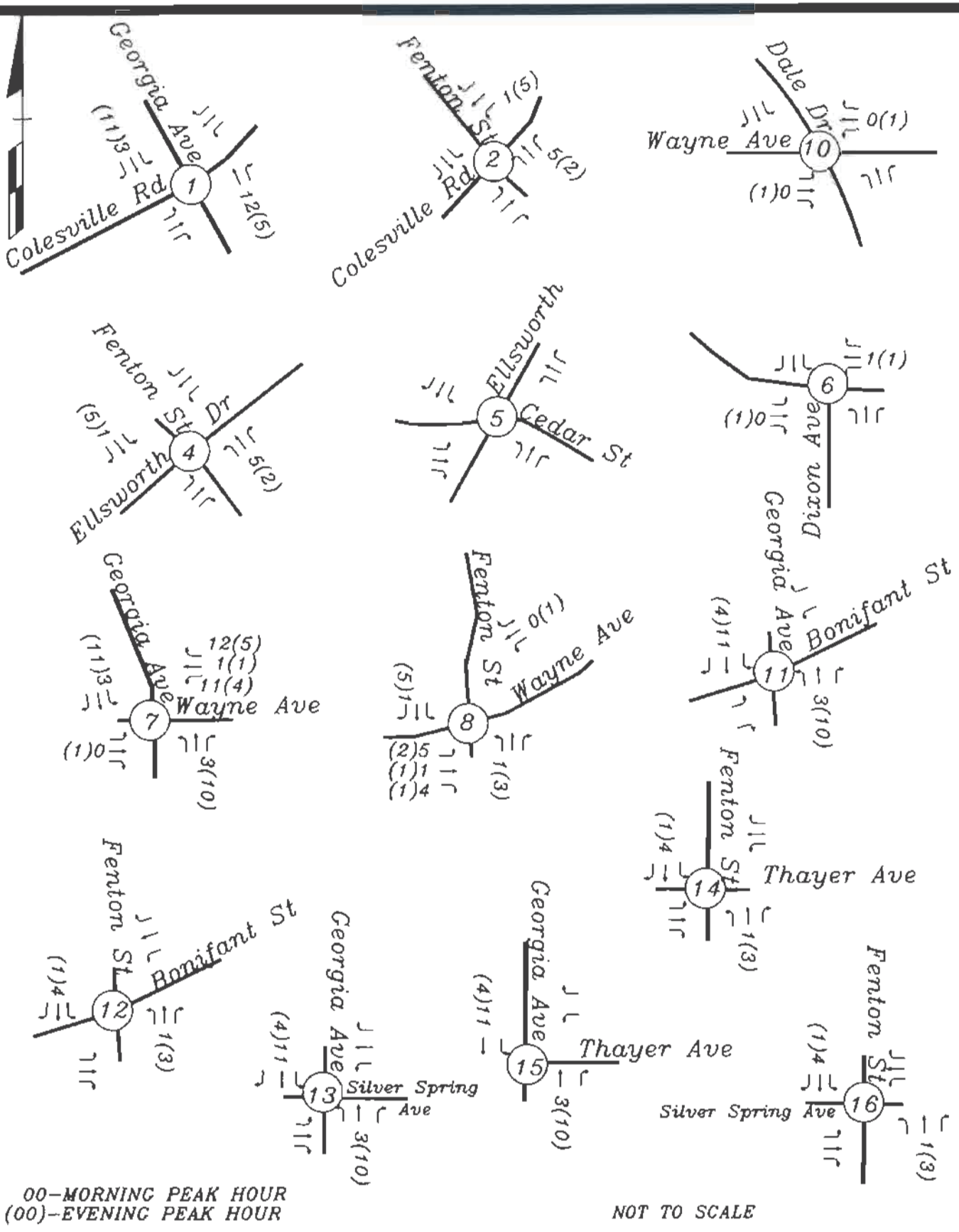
SUBJECT SITE

DIRECTION	PERCENTAGE
Residential	
North on MD 97	34%
North on US 29	15%
South on MD 97/US 29	32%
West on MD 410	4%
East on MD 410	11%
East on MD 193	4%
Commercial	
North on MD 97	34%
North on US 29	26%
South on MD 97/US 29	19%
West on MD 410	5%
East on MD 410	8%
East on MD 193	8%

The site generated trips were assigned to the road network under study, and the resulting trips are illustrated in Exhibits 7, 7A and 7B. The site generated traffic was combined with the existing volumes to produce the Total Traffic Volumes shown in Exhibits 8 and8A.

Analysis of Total Traffic Conditions

STS LTD performed capacity analyses, applying the critical lane technique to the total projected volumes to determine the impact of the development. The results of the analyses are summarized in Table 8. The capacity analysis worksheets are contained in Appendix G.

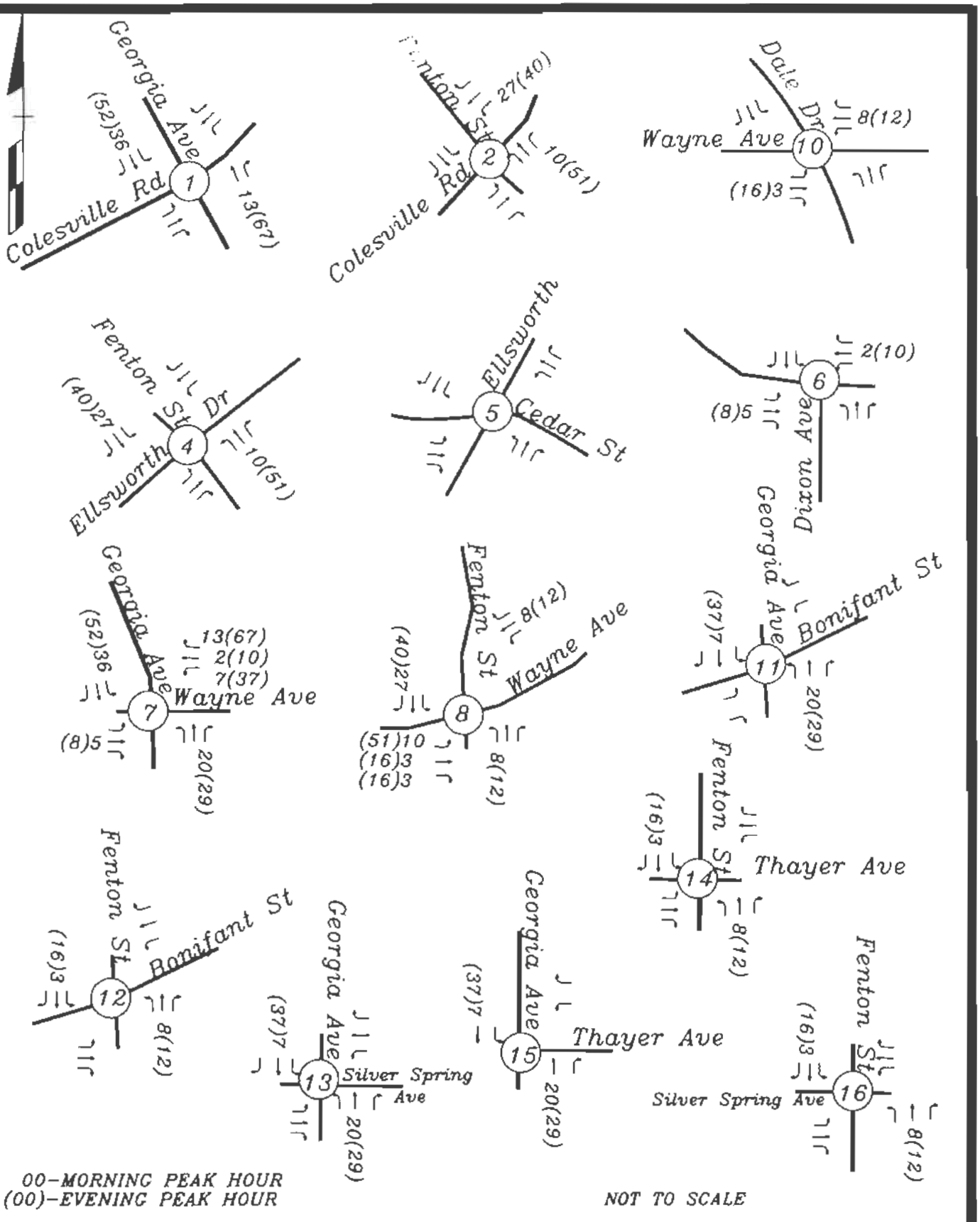


00–MORNING PEAK HOUR
(00)–EVENING PEAK HOUR

NOT TO SCALE

STREET TRAFFIC STUDIES, LTD.

Exhibit 7
Site Generated Trips
Residential

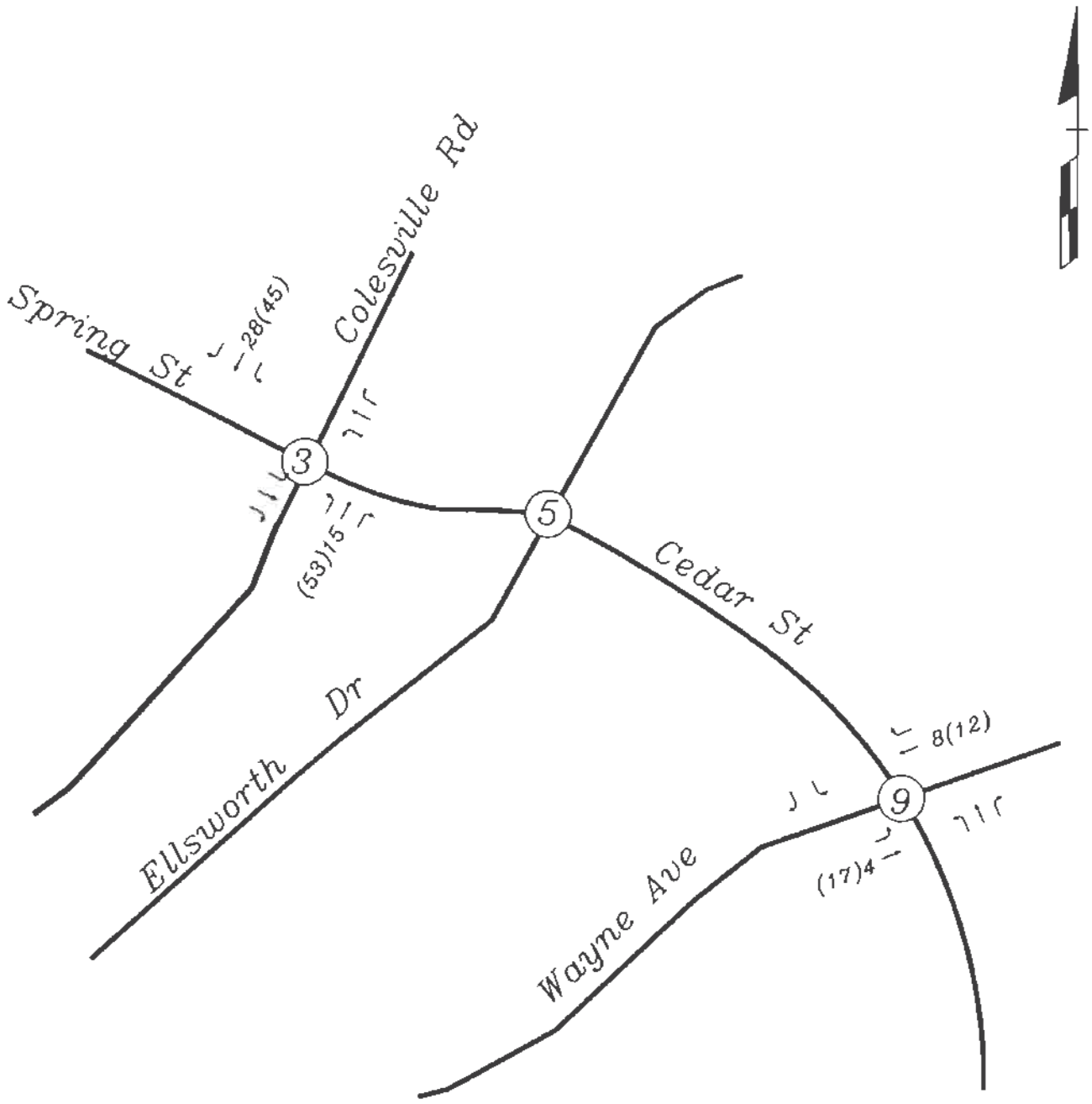


00-MORNING PEAK HOUR
(00)-EVENING PEAK HOUR

NOT TO SCALE

STREET TRAFFIC STUDIES, LTD.

Exhibit 7A
Site Generated Trips
Commercial



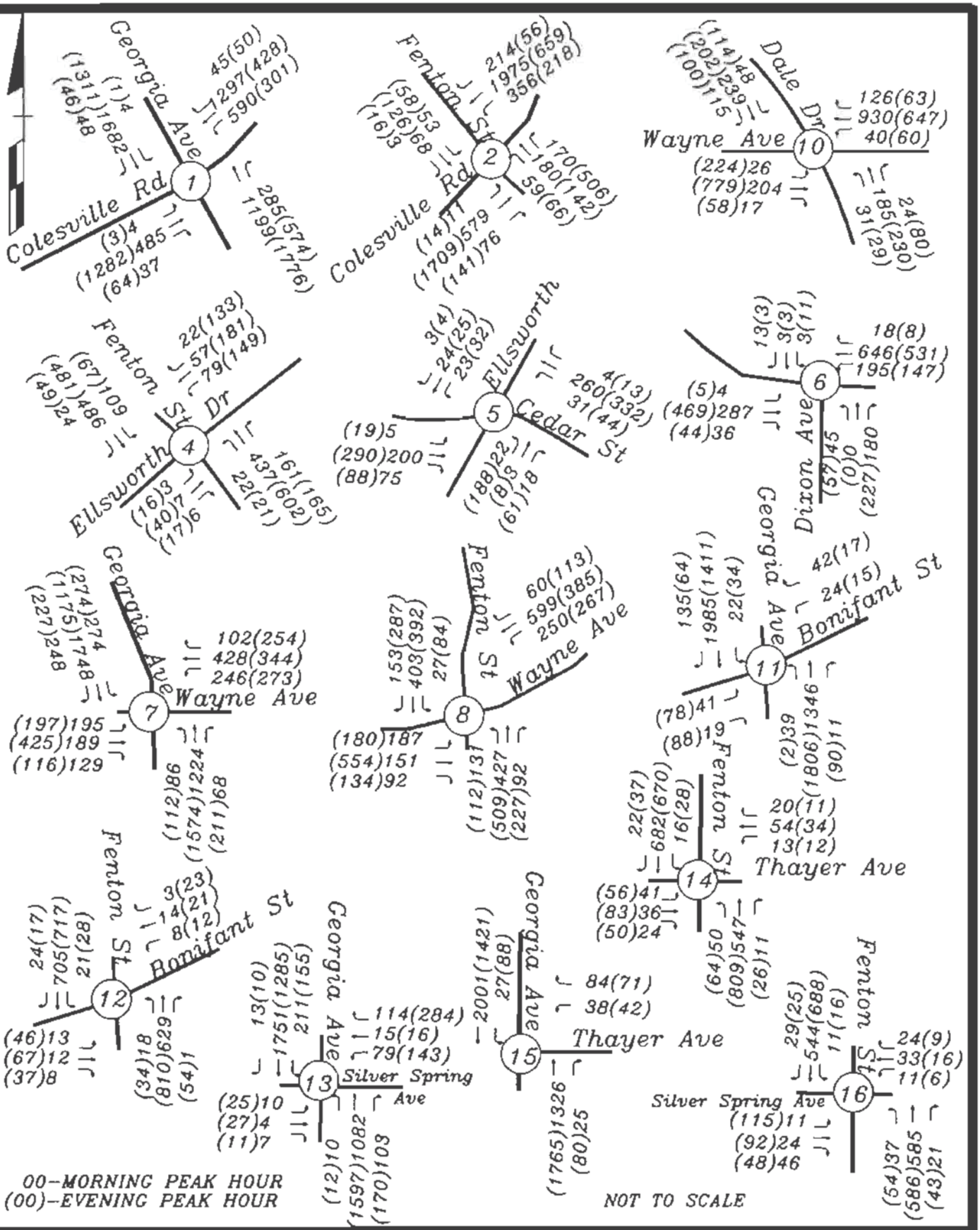
Note: Total commercial and residential

00–MORNING PEAK HOUR
(00)–EVENING PEAK HOUR

NOT TO SCALE

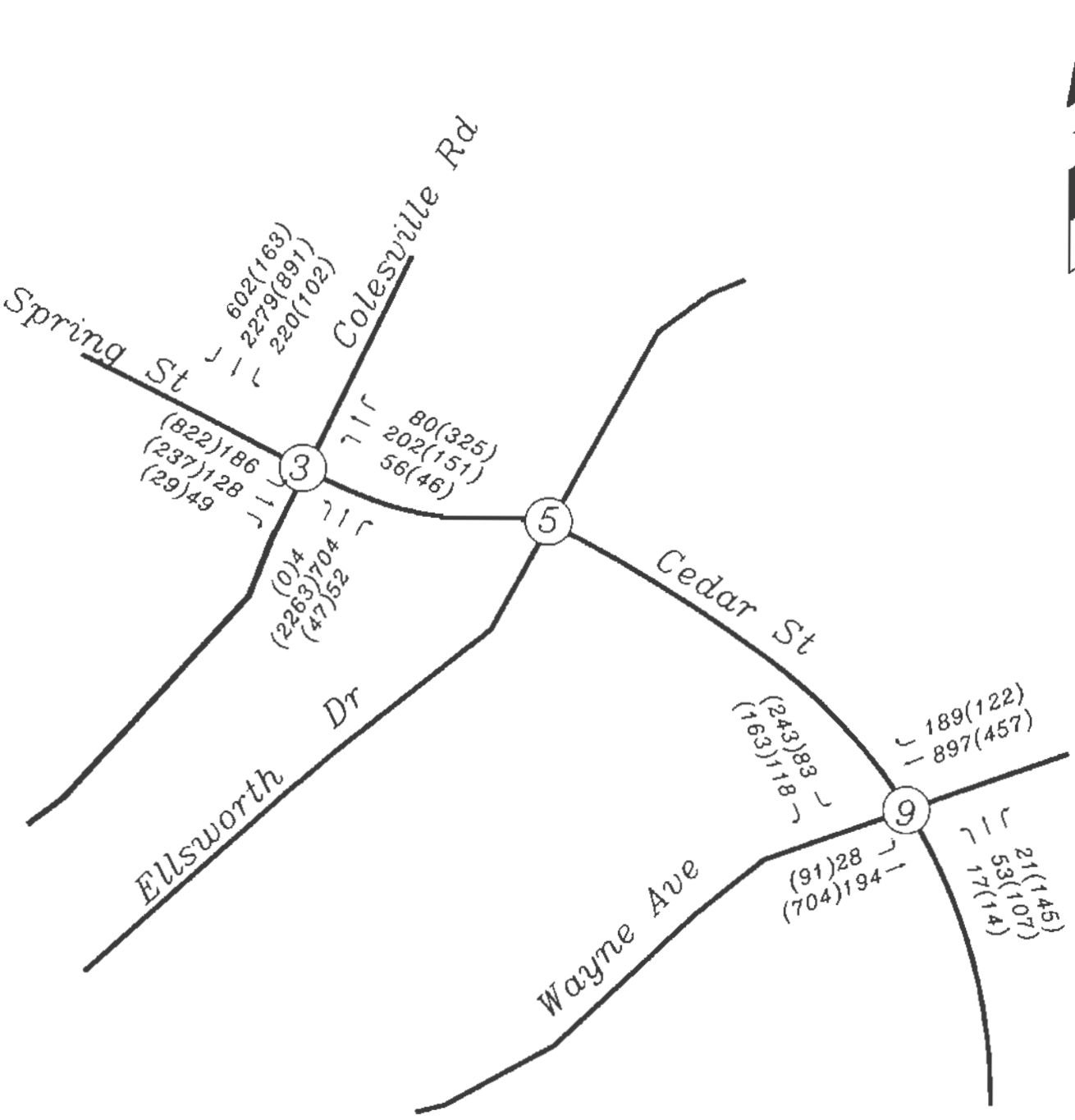
STREET TRAFFIC STUDIES, LTD.

Exhibit 7B
Site Generated Trips



STREET TRAFFIC STUDIES, LTD.

Exhibit 8
Total Traffic Volumes



NOT TO SCALE

00–MORNING PEAK HOUR
(00)–EVENING PEAK HOUR

STREET TRAFFIC STUDIES, LTD.

Exhibit 8A
Total Traffic Volumes

TABLE 8

RESULTS OF CAPACITY ANALYSIS

TOTAL TRAFFIC CONDITIONS

INTERSECTION	MORNING PEAK HOUR	EVENING PEAK HOUR
Colesville Rd @ Spring St	1225	1397
Colesville Rd @ Georgia Ave	1426	1350
Ellsworth Dr @ Cedar Street	249	493
Ellsworth Dr at Fenton St	824	1116
Wayne Ave at Dale Dr	1041	1099
Wayne Ave at Cedar St	711	570
Wayne Ave at Fenton St	1473	1423
Wayne Ave at Georgia Ave	1300	1494
Wayne Ave at Dixon Ave	505	577
Bonifant St at Fenton St	787	1054
Bonifant St at Georgia Ave	930	838
Thayer Ave at Georgia Ave	862	884
Thayer Ave at Fenton St	882	1064
Silver Spring Ave at Fenton St	709	1028
Silver Spring Ave at Georgia Ave	881	1281

X - Critical Lane Volume

As shown in Table 8, the critical intersections, as identified by MNCPPC staff, are projected to operate below the 1800 CLV threshold for the Silver Spring CBD Policy area after completion of the subject project.

PEDESTRIAN AND TRANSIT CONSIDERATIONS

In accordance with the *Local Area Transportation and Policy Area Mobility Review Guidelines* the results of the pedestrian counts that were conducted as part of the base data collection process at the study intersections are included in Appendix B.

The largest concentration of pedestrian activity occurred at the intersection of Dixon Avenue and Wayne Avenue, with totals in the range of 950 pedestrians per hour (all approach legs) during both peak hours. AT the intersection of Fenton Street and Ellsworth Drive, this value was exceeded during the evening peak hour, with a total of 1296 pedestrian movements at the location. It is important to note the majority of intersections in the CBD have countdown pedestrian signals, and as modifications are made, they will also be retrofitted with accessible pedestrian signals (APS). Overall, the area is well served by pedestrian signals and ADA ramps.

The Silver Spring CBD is served by the Washington Metropolitan Area Transit Authority's (WMATA) Silver Spring Metro Station, WMATA regional bus service, Montgomery County's RideOn bus service, and the Maryland Transit Administration's MARC commuter rail service.

The Silver Spring Metro Station (Red Line) is located at the intersection of Colesville Road and Wayne Avenue. Service is provided at three to six minute headways during the peak periods and twelve minute headways during non-peak periods.

MARC commuter rail service is provided on three lines which serve the Washington - Baltimore corridor and terminates at the WMATA Union Station Metro Station in the District of Columbia. MARC platforms are located within the Silver Spring Metro Station, and service is provided during peak commuting periods only.

WMATA regional bus service is operated throughout the CBD with all lines stopping at the Silver

Spring Metro Station. WMATA currently operates routes J1, J2, and J3 between Silver Spring and the Montgomery Mall Transit Center. The J5 route operates between Silver Spring and the Twinbrook Metro Station.. Routes Y5, Y7, Y8 and Y9 operate between Silver Spring and Montgomery General Hospital in Olney, Maryland. Additionally, WMATA operates routes F4 and F6 between Silver and the New Carrollton Metro Station.

Montgomery County's RideOn service operates numerous routes, all with stops at the Silver Spring Metro Station, including Route 28 (Van Go) which operates as a free local shuttle within the Silver Spring CBD. Overall, the area is well served by transit with direct connections to the Silver Spring Metro Station.

It should also be noted that there is an existing bus stop and shelter at the intersection of Fenton Street and Wayne Avenue in the southwest quadrant.

Pedestrian Analysis

MNCPPC has requested a specific review of pedestrian movements at the intersection Wayne Avenue and Fenton Street to ensure adequate pedestrian capacity at the location once the library has relocated to the intersection. Pedestrian movements were observed on Thursday, April 16, 2009 at the location. Based on this data the crosswalk located on the west leg of the intersection (this crossing is anticipated to be used by future library visitors) is currently serving a maximum of 137 pedestrian movements (two-way) in the evening peak hour.

The data collection at the existing facility on Wednesday, April 22, 2009, revealed person trips at the library entrances during the peak periods. Based on the data, we anticipate a total of 108 person trips; i.e. pedestrians during the evening peak hour (to and from the library). Combining these trips with the existing crossings results in a peak hour flow of 245 pedestrians within the west leg crosswalk. This value can easily be accommodated with the existing facilities available at the intersection. The

estimated volumes would result in a Level of Service "C" applying methodologies found in the Highway Capacity Manual (HCM). Furthermore, the intersection of Wayne Avenue and Fenton Street currently has countdown pedestrian signals and adequate crosswalk markings.

POLICY AREA MOBILITY REVIEW

The Silver Spring CBD Policy Area has a requirement that 10% of new trips must be mitigated to meet the standards established for Policy Area Mobility Review (PAMR).

The *Local Area Transportation and Policy Area Mobility Review Guidelines* provide both County wide trip generation rates, s well as, specific rates for the Silver Spring CBD. The County wide rates were used to project the base trips for the various uses proposed. Table 9 presents the trip generation rates for the site and the resulting trips generated are presented in Table 10.

The PAMR guidelines require a 10 percent reduction in new base trips in the CBD. Thus, the required reduction equates to a maximum of 39 trips, as calculated below.

Primary Trips	x 10 percent (0.10)	Trips to be Mitigated
394 trips	394 trips x 0.10 = 39	39 trips

As shown in Table 10, the relocation of the Silver Spring Library and the associated uses is projected to generate a minimum of 26 percent fewer trips than with the base rates; therefore, the project satisfies the PAMR goal of a ten percent reduction when compared to the trip generation using the County wide rates.

TABLE 9
SILVER SPRING LIBRARY SITE
TRIP GENERATION RATES

DEVELOPMENT	MORNING PEAK HOUR IN	OUT	TOTAL	EVENING PEAK HOUR IN	OUT	TOTAL
Base Rates						
Residential Hi Rise						
Trips/DU	T=0.30(x)			T=0.30(x)		
	20%	80%	100%	70%	30%	100%
Retail						
Trips/1000 sf	T=0.50(y)			T=2.00(y)		
	50%	50%	100%	50%	50%	100%
Office (CBD)						
Trips/1000 sf	T=1.40(y)			T=1.40(y)		
	85%	15%	100%	15%	85%	100%
Library						
Trips	T=1.56(x)			T=Existing trips x 1.50		
Arts Center						
Trips/1,000 sf	T-0.67(x)			T=1.92(x)		
	100%/0%			0%/100%		
Silver Spring CBD Rates						
Office						
Trips/1,000 sf	T=1.40(x)			T=1.40(x)		
	85%/15%			15%/85%		
Retail						
Trips/1,000 sf	T=0.50(x)			T=2.00(x)		
	50%/50%			50%/50%		
Hi-Rise						
Trips/DU	T=0.30(y)			T=0.30(y)		
	20%/80%			70%/30%		
Library						
Trips	T=1.56(x)			T=Existing trips x 1.50		
Arts Center						
Trips/1,000 sf	T-0.67(x)			T=1.92(x)		
	100%/0%			0%/100%		

TABLE10
SILVER SPRING LIBRARY SITE TRIP GENERATION COMPARISON

DEVELOPMENT	MORNING PEAK HOUR			EVENING PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
County wide Base Generation						
Library						
Trips/63,000 sf			98			247
Arts Center						
Trips/20,000 sf			13			38
Hi-Rise						
Trips/146 units			53			62
Retail						
Trips/22,000 sf			68			272
Office						
Trips/15,000 sf			21			34
TOTALS			253			653
Silver Spring Rate Generation						
Library						
Trips/63,000 sf			98			247
Arts Center						
Trips/20,000 sf			13			38
Hi-Rise						
Trips/146 units			44			44
Retail						
Trips/22,000 sf			11			44
Office						
Trips/15,000 sf			21			21
TOTALS			187			394
Difference			**-66**			**-259**
Percent Reduction			**26%**			**39%**

PURPLE LINE EVALUATION

The Purple Line is a proposed sixteen (16) mile light rail or rapid bus line which will run between Bethesda in Montgomery County and New Carrollton in Prince George's County, Maryland. The service will provide direct connections to metro rail and commuter MARC rail lines, as well as, local and inter-city bus routes. The Purple Line has been under study since 1992 by the Maryland Transit Administration (MTA).

The schedule calls for construction to begin circa 2014 and extend until 2017. Given the local area nature of the foregoing analysis a detailed review of specific impacts is beyond the typical five year horizon for a LATR study. Therefore, a full evaluation of impacts has not been conducted herein. MNCPPC staff concur with the rationale that the build-out of the planned station at the library is beyond this analysis. Information pertaining to the Purple Line is contained in Appendix H.

CONCLUSION

A traffic impact study was performed in accordance with the *Local Area Transportation and Policy Area Mobility Review Guidelines* for the proposed **Silver Spring Library Relocation**, located in the Silver Spring CBD area of Montgomery County, Maryland. The results of the analysis indicate that the project can be completed without adversely impacting traffic conditions within the study area established by MNCPPC staff. Each critical intersection is projected to operate below the CLV threshold of 1800 for the Silver Spring CBD Policy Area.

Furthermore, the Silver Spring CBD Policy Area has a requirement that 10% of new trips must be mitigated to meet the standards established for Policy Area Mobility Review (PAMR). The relocation of the Silver Spring Library and the associated uses is projected to generate a minimum of 26 percent fewer trips than with the base rates; therefore, the project satisfies the PAMR goal of a ten percent reduction when compared to the trip generation using the County wide rates. That is, the project is projected to generate fewer trips than a similar project located elsewhere in the County.